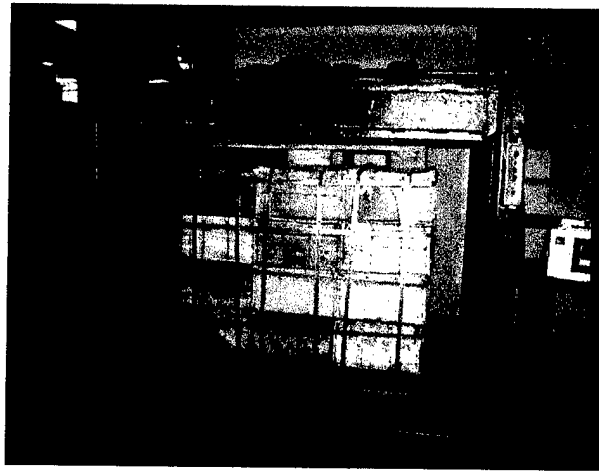


**FINAL REPORT
MAY 2003**

REPORT NO. 03-10



**ALTERNATE MATERIAL PALLET, 40"x 48",
MIL-STD-1660,
ENGINEERING EVALUATION TESTS**

Prepared for:
U.S. Army Defense Ammunition Center
ATTN: SJMAC-DET
1 C Tree Road, Bldg 35
McAlester, OK 74501-9053

Distribution Unlimited



**VALIDATION ENGINEERING DIVISION
MCALESTER, OKLAHOMA 74501-9053**

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**REPORT NO. 03-10
ALTERNATE MATERIAL PALLET, 40"x 48",
MIL-STD-1660, ENGINEERING EVALUATION TESTS**

May 2003

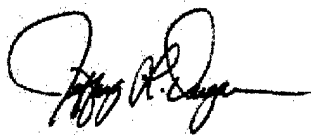
ABSTRACT

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV) conducted Engineering Evaluation Tests to determine if the Alternate Material Pallet manufactured by Hunter Paine Enterprise, Inc. in Lafayette California, could be utilized for the shipment of ammunition. The Test Unit was evaluated by the testing procedures in MIL -STD-1660. The Test Unit had a total test weight of 3,900 pounds. The plan was to test the Test Unit by accomplishing the stacking, vibration, drop, incline impact, sling compatibility, forklift handling, and disassembly tests.

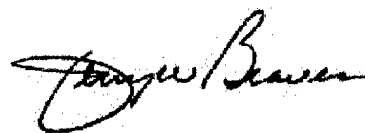
The Test Unit appeared to pass the stacking and vibration test requirements. The Test Unit failed during the first drop test. All three post boards broke completely in half in the center during the first drop. The test could not be continued. During the disassembly of the load, it was noted that all of the top deck boards had broken in several places sometime during the testing process. This pallet is not recommended for use by the U.S. Army.

Prepared by:

Reviewed by:



JEFFERY L. DUGAN
Validation Engineer



JERRY W. BEAVER
Chief, Validation Engineering Division

U.S. ARMY DEFENSE AMMUNITION CENTER

VALIDATION ENGINEERING DIVISION
MCALESTER, OK 74501-9053

REPORT NO. 03-10

**ALTERNATE MATERIAL PALLET, 40"x 48",
MIL-STD-1660, ENGINEERING EVALUATION TESTS**

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PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV) conducted Engineering Evaluation Tests to determine if the Alternate Material Pallet manufactured by Hunter Paine Enterprise, Inc. in Lafayette California, could be utilized for the shipment of ammunition. The Test Unit was evaluated by the testing procedures in MIL-STD-1660. The Test Unit had a total test weight of 3,900 pounds. The plan was to test the Test Unit by accomplishing the stacking, vibration, drop, incline impact, sling compatibility, forklift handling, and disassembly tests. The unitization procedures were provided by DAC, Transportation Engineering Division (SJMAC-DET).

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Joint Munitions Command, Rock Island, IL. Reference is made to the following:

1. Change 6, AR 740-1, 18 August 1976, Storage and Supply Activity Operation.
2. OSC-R, 10-23, Mission and Major Functions of the U.S. Army Defense Ammunition Center (DAC) 21 Nov 2000.

C. OBJECTIVE. The objective of the tests was to determine if the alternate material pallet met MIL-STD-1660 test requirements prior to the acceptance of the unitization procedures by the U.S. Army.

D. CONCLUSION. The Test Unit appeared to pass the stacking and vibration test requirements. The Test Unit failed during the first drop test. All three post boards broke completely in half in the center during the first drop. The test could not be continued. During the disassembly of the load, it was noted that all of the top deck boards had broken in several places sometime during the testing process. This pallet is not recommended for use by the U.S. Army.

PART 2 - ATTENDEES

DATE PERFORMED:

Test Unit - 11 March 2003

ATTENDEES

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General Engineer
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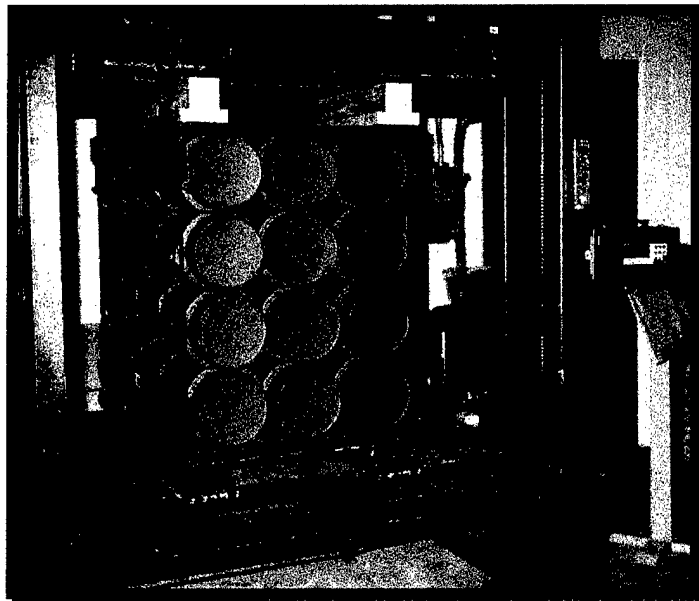
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PART 3 - TEST PROCEDURES

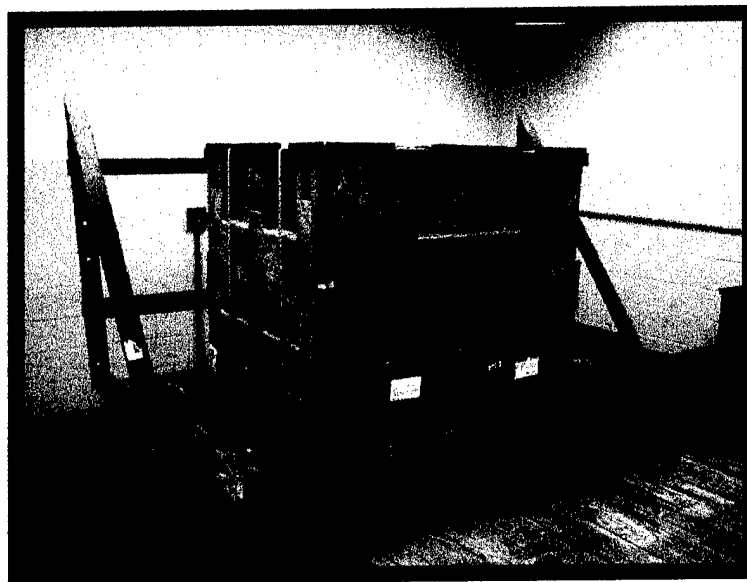
The test procedures outlined in this section were extracted from the MIL-STD-1660, "Design Criteria for Ammunition Unit Loads," 8 April 1977. This standard identifies steps that a unitized load must undergo if it is to be considered acceptable. The seven tests normally conducted on the test specimen are summarized below.

A. STACKING TEST. The specimen will be tested to simulate a stack of identical unit loads stacked 16 feet high, for a period of one hour. This stacking load will be simulated by subjecting the unit load to a compression weight equal to an equivalent 16-foot stacking height. Photo 1 below shows an example of a unit load in the compression tester.



**Photo 1. Example of Compression Tester.
(2.75-inch Hydra 70, PA151 Rocket Pallet in the compression tester.)**

B. REPETITIVE SHOCK TEST. The repetitive shock test is conducted IAW Method 5019, Federal Standard 101. The test procedure is as follows: The test specimen will be placed on (not fastened to) the platform. With the load in one position, the platform will be vibrated at 1/2-inch amplitude (1-inch double amplitude) starting at a frequency of approximately 3 cycles-per-second. The frequency will be steadily increased until the package leaves the platform. The resonant frequency is achieved when a 1/16-inch-thick feeler gage momentarily slid freely between every point on the specimen in contact with the platform at some instance during the cycle. Midway into the testing period, the specimen will be rotated 90 degrees, and the test continued for the duration. Unless failure occurred, the total time of vibration will be three hours. Photo 2 shows an example of the repetitive shock test.

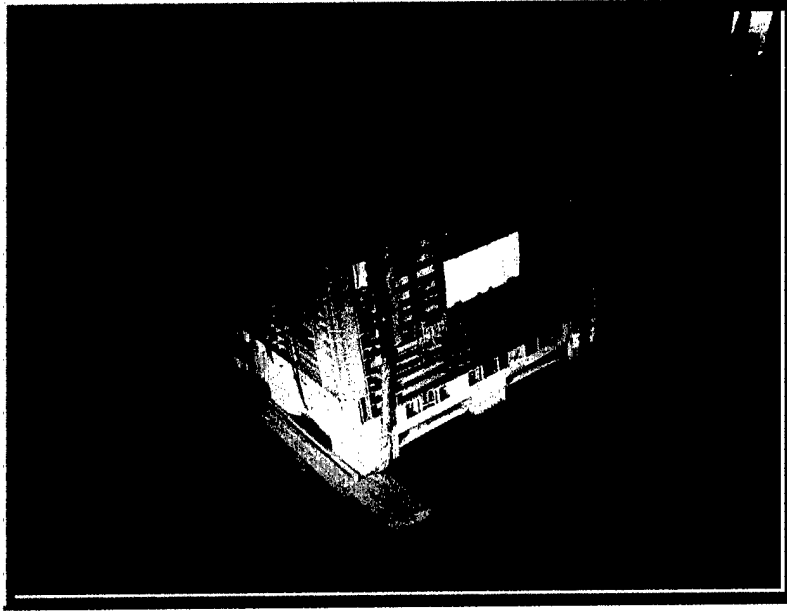


**Photo 2. Example of the Repetitive Shock Test.
(Plastic Gemini Pallet Box)**

C. EDGEWISE ROTATIONAL DROP TEST. This test is conducted using the procedures of Method 5008, Federal Standard 101. The procedure for the

edgewise rotational drop test is as follows: The specimen will be placed on its skids with one end of the pallet supported on a beam 6 inches high. The height of the beam will be increased as necessary to ensure that there is no support for the skids between the ends of the specimen when dropping takes place, but was not high enough to cause the specimen to slide on the supports when the dropped end is raised for the drop. The unsupported end of the specimen is then raised and allowed to fall freely to the concrete, pavement, or similar unyielding surface from a prescribed height. Unless otherwise specified, the height of drop for level A protection conforms to the following tabulation:

GROSS WEIGHT (WITHIN RANGE LIMITS) (Pounds)	DIMENSIONS OF ANY EDGE, HEIGHT OR WIDTH (WITHIN RANGE LIMITS) (Inches)	HEIGHT OF DROPS ON EDGES	
		Level A (Inches)	Level B (Inches)
150-250	60-66	36	27
250-400	66-72	32	24
400-600	72-80	28	21
600-1,000	80-95	24	18
1,000-1,500	95-114	20	16
1,500-2,000	114-144	17	14
2,000-3,000	Above 145- No limited	15	12
Above – 3,000		12	9



**Photo 3. Example of Edgewise Rotational Drop Test
(Plastic XYTEC 4845 Pallet Box)**

D. INCLINE-IMPACT TEST. This test is conducted by using the procedure of Method 5023, Incline-Impact Test of Federal Standard 101. The procedure for the incline-impact test is as follows: The specimen is placed on the carriage with the surface or edge to be impacted projecting at least 2 inches beyond the front end of the carriage. The carriage will be brought to a predetermined position on the incline and released. If it were desired to concentrate the impact on any particular position on the container, a 4- x 4-inch timber may be attached to the bumper in the desired position before the test. The carriage struck no part of the timber. The position of the container on the carriage and the sequence in which surfaces and edges were subjected to impacts may be at the option of the testing activity and dependent upon the objective of the test. When the test is to determine satisfactory requirements for a container or pack, and, unless otherwise specified, the specimen will be subjected to one impact on each surface that has each dimension less than 9.5 feet. Unless otherwise specified, the velocity at the time of the impact was 7 feet-per-second. Photo 4 shows an example of this test.

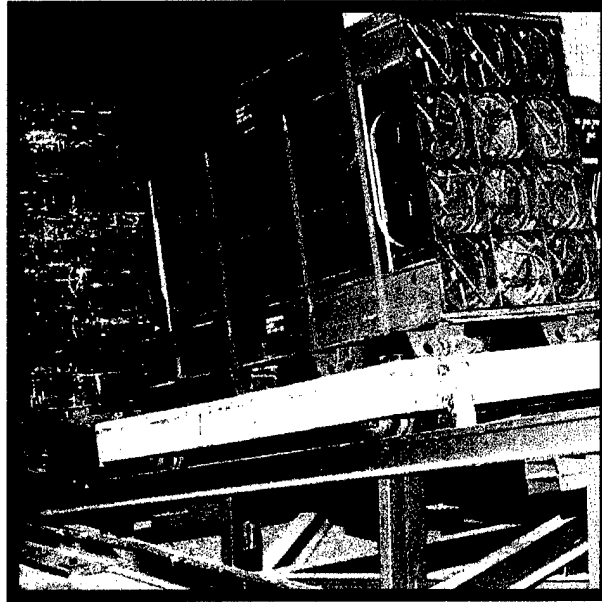


Photo 4. Example of the Incline-Impact Test.
(2.75-Inch, Hydra 70, PA151 Rocket Pallet on incline-impact tester.)

E. SLING COMPATIBILITY TEST. The specimen utilizing special design or non-standard pallets will be lifted, swung, lowered and otherwise handled as necessary, using slings of the types normally used for handling the unit loads under consideration. Slings will be easily attached and removed. Danger of slippage or disengagement when load is suspended will be cause for rejection of the unit load.

F. FORKLIFTING TESTS. The specimen shall be lifted clear of the ground by a forklift from the end of the specimen and transported on the forks in the level or back-tilt position across a hard pavement for a distance of not less than 100 feet. The forklift will pass over the forklift hazard course as outlined in MIL-STD-1660. The hazard course will consist of parallel pairs of 1-inch boards spaced 54 inches apart and will be laid flatwise on the pavement across the path of the forklift. The first pair will be placed securely across the forklift's path and centered 30 feet from the starting point; the second pair will be laid 60 feet from the starting point at an angle of approximately 60 degrees to the path so the first wheel strikes first; and the third pair will be laid 90 feet

from the starting point approximately 75 degrees to the path so the right wheel strikes first. The forklift will pass over the forklift hazard course 3 times in approximately 23 seconds, and then be brought to a stop. The load shall be observed for deflection and damage. The specimen will be rotated 90 degrees and the load lifted from the side and the above steps repeated.

G. DISASSEMBLY TEST. Following all rough handling tests the specimen may be squared up within 2 inches of its original shape and on a flat level surface. The strapping will then be cut and removed from the palletized load. Assembly of the load will be such that it retains its unity upon removal of the strapping.

PART 4 - TEST EQUIPMENT

A. COMPRESSION TESTER.

1. Nomenclature	Compression Table
2. Manufacturer:	Ormond Manufacturing
3. Platform:	60- by 60-inches
4. Compression Limit:	50,000 pounds
5. Tension Limit:	50,000 pounds

B. TRANSPORTATION (REPETITIVE SHOCK)SIMULATOR.

1. Nomenclature	Repetitive Shock Simulator
2. Manufacturer:	Gaynes Laboratory
3. Capacity:	6,000-pound payload
4. Displacement:	1/2-inch amplitude
5. Speed:	50 to 400 RPM
5. Platform:	5- by 8-foot

C. INCLINED PLANE.

1. Nomenclature	Incline Plane Impact Tester
2. Manufacturer:	Conbur Incline
3. Type:	Impact Tester
4. Grade:	10 percent incline
5. Length:	12-foot

PART 5 - TEST RESULTS

A. PALLET DATA. The test unit was inertly loaded to the specified design weight. Special care was taken to ensure that each individual interior ammunition container had the proper amount of weight in order to achieve a realistic pallet center of gravity (CG). Once properly prepared, the Test Unit was tested using MIL-STD-1660, "Design Criteria for Ammunition Unit Loads," requirements.

TEST UNIT:

Test Date: 11 March 2003

Weight: 3,900 pounds

Length: 51 inches

Width: 43-1/2 inches

Height: 39 inches

B. TEST RESULTS of TEST UNIT:

1. COMPRESSION TEST. Test Unit was compressed with a load force of 15,600 pounds for 60 minutes on 11 March 2003. No apparent damage was sustained during the compression tests. See Photo 5 below for a typical picture of the test unit in the compression tester.

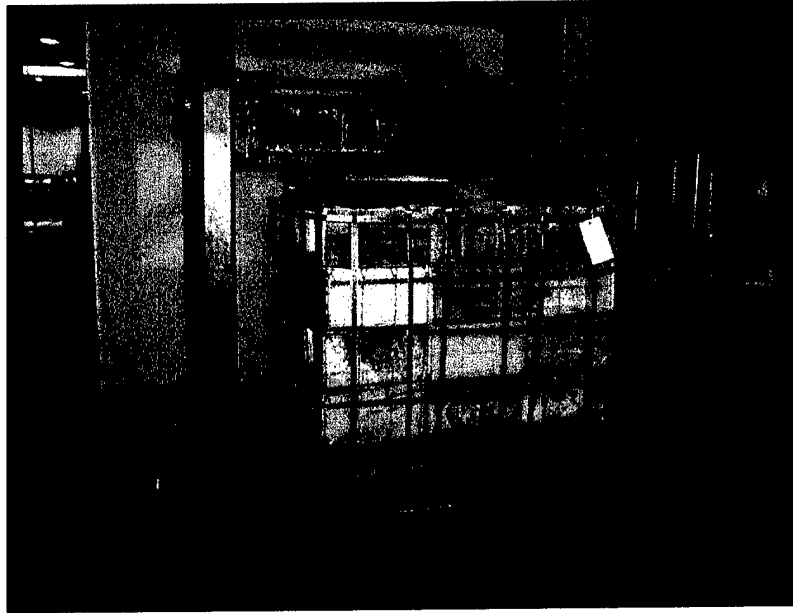


Photo 5. Test Setup for Compression Testing.

2. REPETITIVE SHOCK TEST. Test Unit was vibrated 90 minutes at 250 RPM in the longitudinal orientation and 250 RPM in the lateral orientation with no apparent damage. See Photo 6 for the setup for the vibration test.

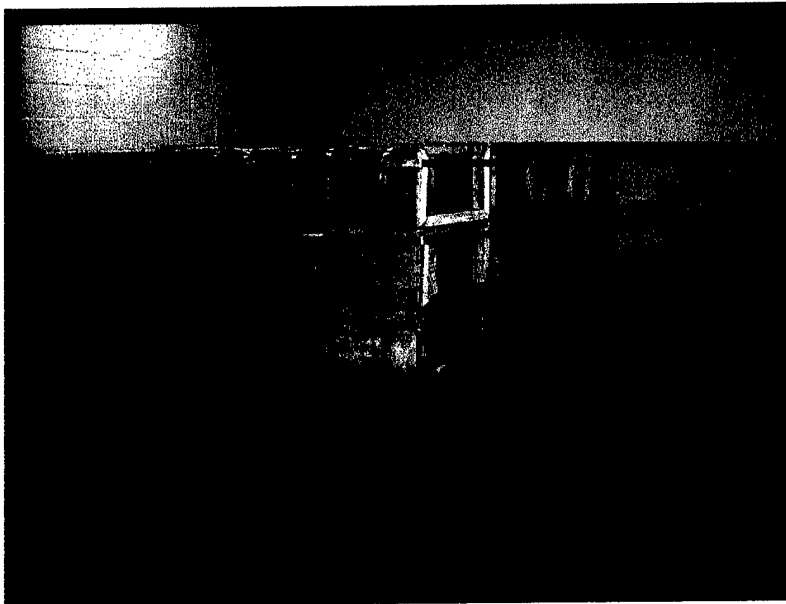


Photo 6. Test Setup for Repetitive Shock Testing.

3. EDGEWISE ROTATIONAL DROP TEST. The Test Unit was edgewise rotationally dropped from a height of 15 inches on the longitudinal side. All three post boards broke completely in half in the center during the first drop. The test could not be continued. During the disassembly of the load, it was noted that all of the top deck boards had broken in several places sometime during the testing process. This pallet is not recommended for use by the U.S. Army. See Photo 7 for damage sustained during the drop test and photo 8 for damage noted during the disassembly of the test unit.



Photo 7. Damage sustained during drop test.

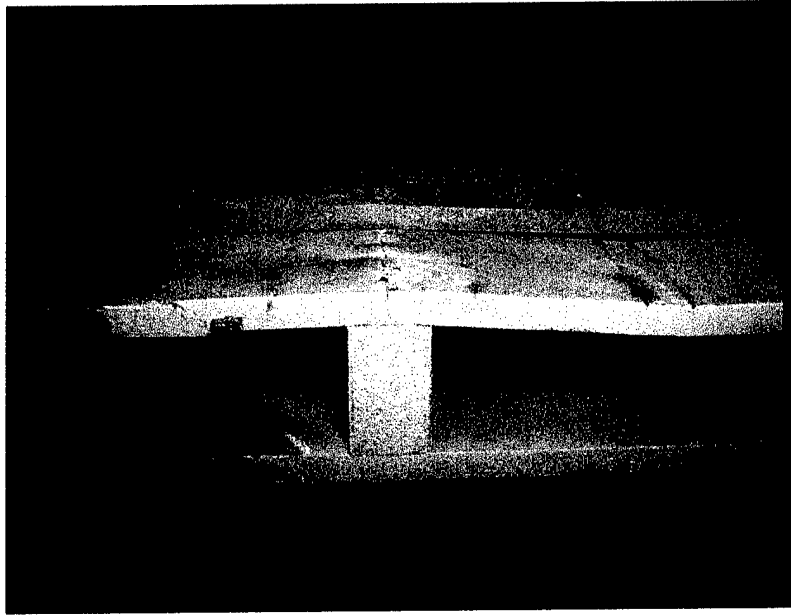


Photo 8. Damage noted during test unit disassembly.

4. CONCLUSION. The pallet as setup in Test Unit does not pass test requirements and is not recommended for use by the U.S. Army.

5. RECOMMENDATION. Due to new International Standards requiring heat treatment on all non-manufactured wood, suggest testing a stronger designed pallet at a lesser weight. Suggest testing a four-stringer design at a 2,500-lb. load.

PART 6– DRAWINGS

The following drawing, 19-48-4116/14, was used only as a guideline for this test purpose because the drawing is for a four-way entry pallet, while the pallet being tested was a two-way entry pallet.

APPENDIX 14

UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLET

CARTRIDGE, CALIBER .50, PACKED VARIOUS
QUANTITIES PER M2 SERIES CONTAINER, 2
CONTAINERS PER WIREBOUND BOX, UNITIZED
48 BOXES PER 40" X 48" PALLET; APPROX BOX
SIZE 14-1/2" L X 12-3/4" W X 8-3/8" H

NOTICE: THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH
THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4116-20PA1002.

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U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND <i>NW</i> <i>David L. Pashovich</i> AMSTA-AR-WEP-RP		CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL/DET THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 4.			
<i>David L. Pashovich</i> AMSTA-AR-WEP-RP		DO NOT SCALE		NOVEMBER 1979	
		ENGINEER OR TECHNICIAN	BASIC REV.	GEORGE FECKE LAURA A. FIEFFER	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>Charles E. Fero</i> U.S. ARMY DEFENSE AMMUNITION CENTER		TRANSPORTATION ENGINEERING DIVISION	<i>George A. Fieffer</i> TESTED		REVISION NO. 14 NOVEMBER 2002
		VALIDATION ENGINEERING DIVISION	<i>George A. Fieffer</i>		SEE THE REVISION LISTING ON PAGE 2
		ENGINEERING DIRECTORATE	<i>William R. Fieffer</i>		CLASS DIVISION DRAWING FILE
					19 48 4116/ 14 20PA1002

PROJECT FSA 146/14-75

PALLET UNIT DATA				
ITEMS INCLUDED		HAZARD CLASS AND DIVISION		APPROX WEIGHT LBS
NSN	DODIC	QD CLASS	COMP GROUP	
1305-				
01-332-8254	A518	1. 4	C	3, 790
01-278-6880	A519	1. 4	C	3, 694
00-764-8386	A520	1. 4	C	3, 406
00-028-6309	A527	1. 4	C	3, 742
00-028-6307	A528	1. 4	C	3, 790
00-028-6562	A530	1. 4	C	3, 790
00-028-6449	A531	1. 4	G	3, 886
00-028-6474	A533	1. 4	G	3, 694
00-028-6592	A533	1. 4	G	3, 790
00-344-2394	A533	1. 4	G	3, 790
00-028-6451	A534	1. 4	G	3, 694
00-028-6471	A540	1. 4	G	3, 694
00-935-2017	A540	1. 4	G	3, 790
00-585-5194	A541	1. 4	G	3, 886
00-028-6601	A543	1. 4	G	3, 790
00-555-4057	A545	1. 4	G	3, 790
00-585-5191	A552	1. 4	C	3, 886
00-028-6574	A555	1. 4	C	3, 790
00-028-6583	A557	1. 4	C	3, 790
00-540-1056	A557	1. 4	C	3, 790
00-541-9834	A557	1. 4	C	3, 790
01-370-2594	A557	1. 4	C	3, 790
00-028-6381	A560	INERT		3, 262
00-028-6384	A560	INERT		3, 886
00-305-0894	A564	1. 4	G	3, 790
00-585-5189	A570	1. 4	C	3, 886
00-585-5188	A571	1. 4	C	3, 886
00-028-6609	A572	1. 4	C	3, 790
00-028-6610	A573	1. 4	C	3, 694
00-028-6611	A574	1. 4	C	3, 454
00-542-0408	A574	1. 4	C	3, 214
00-554-6745	A574	1. 4	C	3, 742
00-935-6067	A574	1. 4	C	3, 790
00-126-3852	A575	1. 4	C	3, 694
00-028-6603	A576	1. 4	G	3, 694
00-028-6604	A577	1. 4	G	3, 790
00-555-4056	A584	1. 4	C	3, 790
00-618-2400	A585	1. 4	G	3, 790
00-618-2399	A586	1. 4	C	3, 694
00-585-1667	A587	1. 4	G	3, 790
00-689-4709	A589	1. 4	G	3, 406
00-752-7891	A589	1. 4	G	3, 646
00-689-4738	A590	1. 4	G	3, 454
00-689-4752	A593	1. 4	C	3, 454
01-127-7870	A595	1. 4	S	1, 630
01-078-4879	A598	1. 4	C	3, 790
01-085-5118	A599	1. 4	C	3, 406
01-126-6201	A602	1. 4	S	1, 630
01-126-6200	A603	1. 4	S	1, 630
00-935-2109	A605	1. 4	C	3, 406
01-249-6888	A607	1. 4	G	3, 790
00-028-6582	A621	1. 4	C	3, 790
01-473-4774	AA06	1. 4	G	3, 790
01-462-0651	AA38	1. 4	C	3, 886
01-464-2541	AA41	1. 4	G	3, 934*
01-464-3218	AA42	1. 4	G	3, 934*
01-481-3854	AA56	1. 4	C	3, 790
01-481-3852	AA57	1. 4	C	3, 790
01-482-1053	AA58	1. 4	C	3, 934*

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* SEE GENERAL NOTE "L" ON PAGE 3.

▲ THESE ARE NAVY GENERATED NSNS, WHICH ARE MARKED AND PACKAGED IAW NAVY PACKING AND MARKING DRAWINGS, HOWEVER, THE NAVY DRAWINGS ARE SIMILAR TO ARDEC PACKING AND MARKING DRAWING 12576456.

REVISIONS

REVISION NO. 8, DATED DECEMBER 1986, CONSISTS OF:

1. ADDING ALTERNATIVE FILLER ASSEMBLY.
2. DELETING ITEMS BY NATIONAL STOCK NUMBER (NSN) FROM "PALLET UNIT DATA" CHART.

REVISION NO. 9, DATED OCTOBER 1987, CONSISTS OF:

1. ADDING ITEM BY NATIONAL STOCK NUMBER (NSN) TO "PALLET UNIT DATA" CHART.
2. CHANGING BOX DIMENSIONS.
3. UPDATING DRAWING TO CONFORM TO 1 AND 2 ABOVE.

REVISION NO. 10, DATED SEPTEMBER 1989, CONSISTS OF:

1. ADDING ALTERNATIVE STRAPPING.
2. ADDING GENERAL NOTES "J" THRU "M".
3. DELETING ITEMS BY NATIONAL STOCK NUMBER (NSN) FROM "PALLET UNIT DATA" CHART.

REVISION NO. 11, DATED AUGUST 1994, CONSISTS OF:

1. ECP MOS3054 DATED 90-05-24.
2. ADDING ITEM BY NATIONAL STOCK NUMBER (NSN) TO "PALLET UNIT DATA" CHART.
3. CHANGING WEIGHT AND COMP GROUP OF ITEM IN "PALLET UNIT DATA" CHART.

REVISION NO.12, DATED DECEMBER 1998, CONSISTS OF:

1. ADDING ITEM BY NATIONAL STOCK NUMBER (NSN) TO "PALLET UNIT DATA" CHART.
2. DELETING GENERAL NOTE RELATING TO THE STRAP CUTTER AND RE-LETTERING OTHER GENERAL NOTES.

REVISION NO.13, DATED OCTOBER 2000, CONSISTS OF:

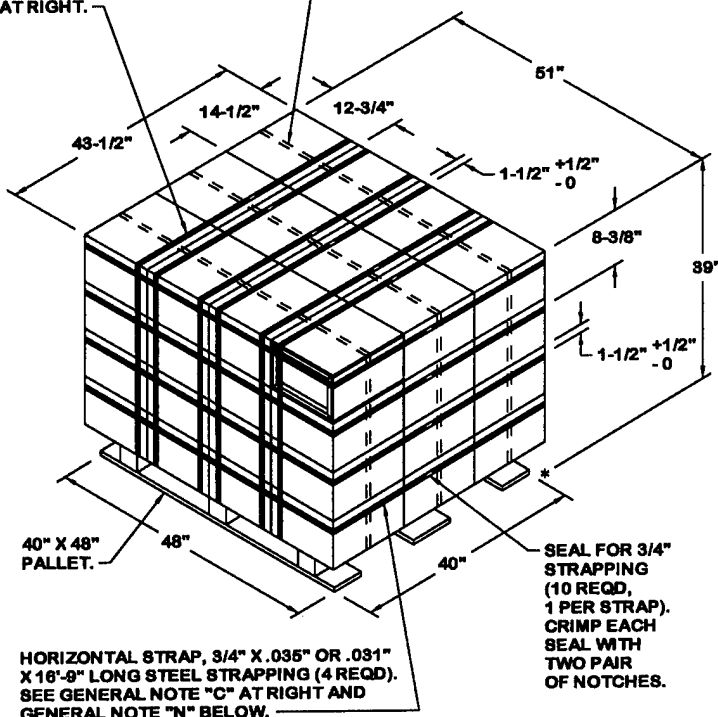
ADDING ITEMS BY NATIONAL STOCK NUMBER (NSN) TO "PALLET UNIT DATA" CHART.

REVISION NO.14, DATED NOVEMBER 2002, CONSISTS OF:

ADDING ITEMS BY NATIONAL STOCK NUMBER (NSN) TO "PALLET UNIT DATA" CHART.

TIEDOWN STRAP, 3/4" X .035" OR .031" X 19'-11" LONG STEEL STRAPPING (6 REQ'D). SEE GENERAL NOTES "D", "H" AND "J" AT RIGHT.

LOAD STRAP (ALTERNATIVE FOR HORIZONTAL STRAP), 3/4" X .035" OR .031" X 15'-2" LONG STEEL STRAPPING (3 REQ'D). SEE GENERAL NOTE "N" BELOW.



HORIZONTAL STRAP, 3/4" X .035" OR .031" X 16'-8" LONG STEEL STRAPPING (4 REQ'D). SEE GENERAL NOTE "C" AT RIGHT AND GENERAL NOTE "N" BELOW.

PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT.

48 BOXES OF .50 CAL CTGS (240 PER BOX) @ 80 LBS	---	3,840 LBS (APPROX)
DUNNAGE	---	14 LBS
PALLET	---	80 LBS
TOTAL WEIGHT	---	3,934 LBS (APPROX)
CUBE	---	50.1 CU FT (APPROX)

BILL OF MATERIAL

PALLET, 40" X 48"	---	1 REQ'D	---	80 LBS
STEEL STRAPPING, 3/4"	---	150.50' REQ'D	---	13.44 LBS
SEAL FOR 3/4" STRAPPING	---	10 REQ'D	---	0.11 LBS

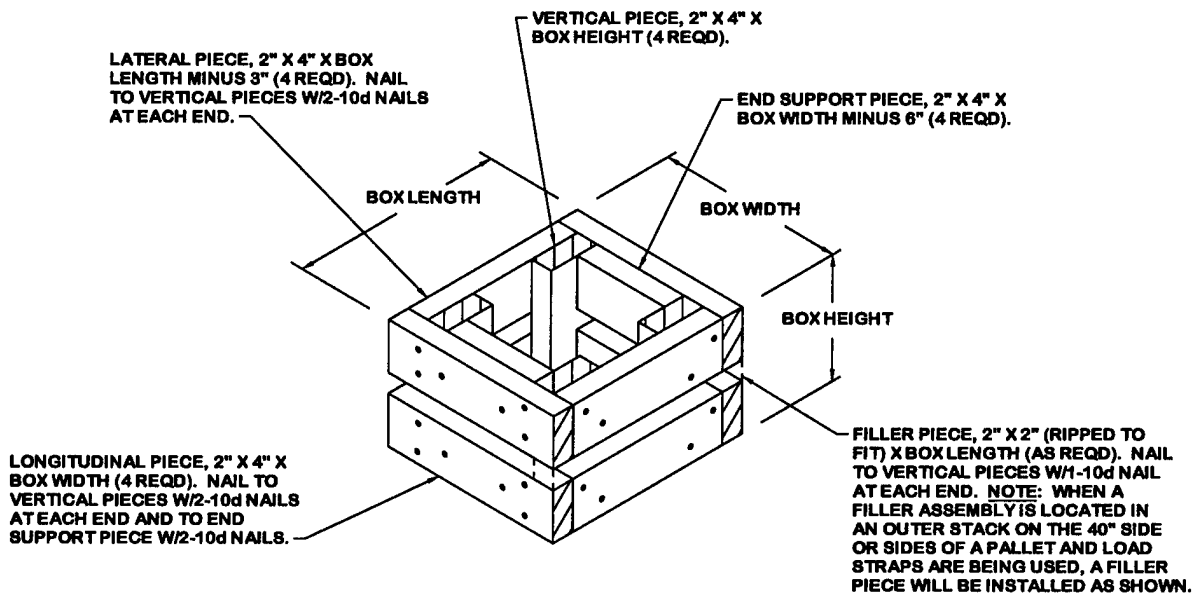
(GENERAL NOTES CONTINUED)

- N. LOAD STRAPS MAY BE USED IN LIEU OF HORIZONTAL STRAPS. LOAD STRAPS WILL BE LOCATED AS SHOWN IN THE DETAIL ABOVE. LOAD STRAPS MAY BE PRE-POSITIONED ON THE PALLET DECK OR THREADED THROUGH THE STRAP SLOTS. NOTICE: WHEN LOAD STRAPS ARE BEING USED IN LIEU OF HORIZONTAL STRAPS, THE THREE OUTBOARD BOXES ON THE BOTTOM LAYER OF THE 40" SIDES OF THE PALLET WILL BE POSITIONED WITH THE TOPS DOWNWARD AND THE THREE OUTBOARD BOXES ON THE TOP LAYER OF THE 40" SIDES OF THE PALLET WILL BE POSITIONED WITH THE TOPS UPWARD.
- O. FOR DETAILS OF THE FEDERAL SPECIFICATION PPP-B-585 WIREBOUND BOX SEE ARDEC DRAWING 7553347.

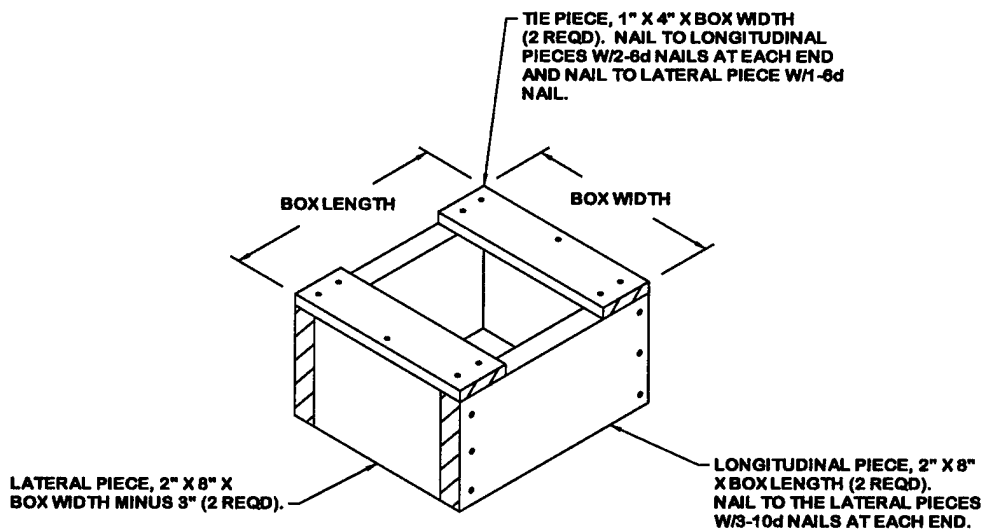
GENERAL NOTES

- A. THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4116-20PA1002. TO PRODUCE AN APPROVED UNIT LOAD, ALL PERTINENT PROCEDURES, SPECIFICATIONS AND CRITERIA SET FORTH WITHIN THE BASIC DRAWING WILL APPLY TO THE PROCEDURES DELINEATED IN THIS APPENDIX. ANY EXCEPTIONS TO THE BASIC PROCEDURES ARE SPECIFIED IN THIS APPENDIX.
- B. DIMENSIONS, CUBE AND WEIGHT OF A PALLET UNIT WILL VARY SLIGHTLY DEPENDING UPON THE ACTUAL DIMENSIONS OF THE BOXES AND THE WEIGHT OF THE SPECIFIC ITEM BEING UNITIZED.
- C. INSTALL EACH HORIZONTAL STRAP TO ENCIRCLE A LAYER OF BOXES ON THE PALLET. NOTE THAT THE STRAPS WILL BE LOCATED AS SHOWN, NEAR THE TOP OF EACH LAYER. HORIZONTAL STRAPS MUST BE TENSIONED AND SEALED PRIOR TO THE APPLICATION OF TIEDOWN STRAPS.
- D. INSTALL EACH TIEDOWN STRAP TO PASS UNDER THE TOP DECK BOARDS OF THE PALLET. NOTE THAT THE STRAPS WILL BE LOCATED AS SHOWN, NEAR THE SIDE CLEATS OF THE END PANELS OF THE BOX. TIEDOWN STRAPS WILL NOT BE APPLIED UNTIL THE HORIZONTAL STRAPS HAVE BEEN TENSIONED AND SEALED.
- E. THE FOLLOWING AMC DRAWINGS ARE APPLICABLE FOR OUTLOADING AND STORAGE OF THE ITEMS COVERED BY THIS APPENDIX.
- | | | |
|------------------|-----|--------------------------------|
| CARLOADING | --- | 19-48-4115-5PA1002 |
| TRUCKLOADING | --- | 19-48-4117-11PA1003 |
| STORAGE | --- | 19-48-4118-1-2-3-4-14-22PA1002 |
| END OPENING ISO | --- | 19-48-4153-15PA1002 |
| CONTAINER | --- | 19-48-4166-15PA1003 |
| MILVAN | --- | 19-48-4267-15PA1009 |
| SIDE OPENING ISO | --- | 19-48-4267-15PA1009 |
| CONTAINER | --- | 19-48-4267-15PA1009 |
- F. IF ITEMS COVERED HEREIN ARE UNITIZED PRIOR TO ISSUANCE OF THIS REVISION TO THIS APPENDIX, THE BOXES NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THIS REVISION.
- G. THE UNITIZATION PROCEDURES DEPICTED HEREIN MAY ALSO BE USED FOR UNITIZING .50 CALIBER CARTRIDGES WHEN IDENTIFIED BY DIFFERENT NATIONAL STOCK NUMBERS (NSN) THAN WHAT IS SHOWN ON PAGE 2, PROVIDED THE BOX PACK DOES NOT VARY FROM WHAT IS DELINEATED HEREIN. THE EXPLOSIVE CLASSIFICATION OF OTHER ITEMS MAY BE DIFFERENT THAN WHAT IS SHOWN.
- H. FOUR 1-1/4" STRAPS MAY BE SUBSTITUTED FOR THE SIX 3/4" TIEDOWN STRAPS SPECIFIED IN THE "PALLET UNIT" AT LEFT. POSITION THE FOUR 1-1/4" STRAPS WHERE THE OUTWARD 3/4" STRAPS ARE POSITIONED. REFER TO GENERAL NOTE "CC" IN THE BASIC UNITIZATION DRAWING 19-48-4116-20PA1002 FOR ADDITIONAL GUIDANCE.
- J. WHEN THE TOTAL WEIGHT OF A 48-BOX UNIT IS 2,800 POUNDS OR LESS, ONLY FOUR TIEDOWN STRAPS WILL BE REQUIRED TO RETAIN THE BOXES ON THE PALLET. OMIT THE CENTER TWO TIEDOWN STRAPS.
- K. IF DEEMED MORE ECONOMICALLY FEASIBLE, THE ALTERNATIVE FILLER ASSEMBLY MAY BE SUBSTITUTED FOR THE FILLER ASSEMBLY TO COMPLETE A LAYER ON A PALLET.
- L. IF THE TOTAL WEIGHT OF A 48-BOX UNIT LOAD EXCEEDS 4,000 POUNDS, A SUFFICIENT NUMBER OF BOXES MUST BE REPLACED WITH "FILLER ASSEMBLIES", AS DEPICTED ON PAGE 4, SO THAT THE TOTAL UNIT WEIGHT IS EQUAL TO OR SLIGHTLY LESS THAN THE 4,000 POUND MAXIMUM ALLOWABLE UNIT WEIGHT.
- M. THE STYLE 1 PALLET DELINEATED IN THE DETAIL ABOVE NEED NOT HAVE CHAMFERS OR STRAP SLOTS AS SPECIFIED WITHIN MILITARY SPECIFICATION MIL-P-15011 WHEN USED FOR THE UNITIZATION OF ITEMS COVERED BY THIS APPENDIX.

(CONTINUED AT LEFT)



FILLER ASSEMBLY
(FOR MINUS ONE BOX)



ALTERNATIVE FILLER ASSEMBLY
(FOR MINUS ONE BOX)
SEE GENERAL NOTE "K" ON PAGE 3.